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WATER SUPPLY OUTLOOK FOR WESTERN UNITED STATES

Including Columbia River Drainage in Canada

Prepared by

U. S. DEPARTMENT of AGRICULTURE ★ SOIL CONSERVATION SERVICE

Collaborating with
CALIFORNIA DEPARTMENT of WATER RESOURCES
and

**BRITISH COLUMBIA DEPARTMENT of
LANDS, FORESTS and WATER RESOURCES**

AS OF
FEB. 1, 1973

TO RECIPIENTS OF WATER SUPPLY OUTLOOK REPORTS:

Most of the usable water in western states originates as mountain snowfall. This snowfall accumulates during the winter and spring, several months before the snow melts and appears as streamflow. Since the runoff from precipitation as snow is delayed, estimates of snowmelt runoff can be made well in advance of its occurrence. Streamflow forecasts published in this report are based principally on measurement of the water equivalent of the mountain snowpack.

Forecasts become more accurate as more of the data affecting runoff are measured. All forecasts assume that climatic factors during the remainder of the snow accumulation and melt season will interact with a resultant average effect on runoff. Early season forecasts are therefore subject to a greater change than those made on later dates.

The snow course measurement is obtained by sampling snow depth and water equivalent at surveyed and marked locations in mountain areas. A total of about ten samples are taken at each location. The average of these are reported as snow depth and water equivalent. These measurements are repeated in the same location near the same dates each year.

Snow surveys are made monthly or semi-monthly from January 1 through June 1 in most states. There are about 1900 snow courses in Western United States and in the Columbia Basin in British Columbia. Networks of automatic snow water equivalent and related data sensing devices, along with radio telemetry are expanding and will provide a continuous record of snow water and other parameters at key locations.

Detailed data on snow course and soil moisture measurements are presented in state and local reports. Other data on reservoir storage, summaries of precipitation, current streamflow, and soil moisture conditions at valley elevations are also included. The report for Western United States presents a broad picture of water supply outlook conditions, including selected streamflow forecasts, summary of snow accumulation to date, and storage in larger reservoirs.

Snow survey and soil moisture data for the period of record are published by the Soil Conservation Service by states about every five years. Data for the current year is summarized in a West-wide basic data summary and published about October 1 of each year.

PUBLISHED BY SOIL CONSERVATION SERVICE

The Soil Conservation Service publishes reports following the principal snow survey dates from January 1 through June 1 in cooperation with state water administrators, agricultural experiment stations and others. Copies of the reports for Western United States and all state reports may be obtained from Soil Conservation Service, Western Regional Technical Service Center, Room 209, 511 N. W. Broadway, Portland, Oregon 97209.

Copies of state and local reports may also be obtained from state offices of the Soil Conservation Service in the following states:

STATE	ADDRESS
Alaska	204 E. 5th. Ave., Room 217, Anchorage, Alaska 99501
Arizona	6029 Federal Building, Phoenix, Arizona 85025
Colorado (N. Mex.)	P. O. Box 17107, Denver, Colorado 80217
Idaho	Room 345, 304 N. 8th. St., Boise, Idaho 83702
Montana	P. O. Box 970, Bozeman, Montana 59715
Nevada	P. O. Box 4850, Reno Nevada 89505
Oregon	1218 S. W. Washington St., Portland, Oregon 97205
Utah	4012 Federal Bldg., 125 South State St., Salt Lake City, Utah 84111
Washington	360 U.S. Court House, Spokane, Washington 99201
Wyoming	P. O. Box 2440, Casper, Wyoming 82601

PUBLISHED BY OTHER AGENCIES

Water Supply Outlook reports prepared by other agencies include a report for California by the Water Supply Forecast and Snow Surveys Unit, California Department of Water Resources, P. O. Box 388, Sacramento, California 95802 --- and for British Columbia by the Department of Lands, Forests and Water Resources, Water Resources Service, Parliament Building, Victoria, British Columbia



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ISSUED
FEBRUARY 1, 1973

The Soil Conservation Service coordinates snow surveys conducted by its staff and many cooperators, including the Bureau of Reclamation, Corps of Engineers, Forest Service, National Park Service, NOAA, National Weather Service, Geological Survey, and other Federal Agencies, Departments of State Government, Irrigation Districts, Power Companies, and others.

The Department of Water Resources coordinates snow surveys in California.

The Water Resources Service, Department of Lands, Forests, and Water Resources directs snow surveys in British Columbia.

This report was prepared by the Water Supply Forecasting Unit, Engineering Division, Soil Conservation Service, from data supplied by Snow Survey Supervisors of the Soil Conservation Service in the States of Alaska, Arizona, Colorado and New Mexico, Idaho, Montana, Nevada, Oregon, Utah, Washington, and Wyoming.

Data from California was supplied by the Chief, Water Supply Forecast and Snow Survey Unit, Department of Water Resources.

Data from British Columbia was supplied by the Chief, Hydrology Division, Water Investigations Branch, Department of Lands, Forests and Water Resources.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
KENNETH E. GRANT, ADMINISTRATOR

WATER SUPPLY OUTLOOK

1973 SNOWMELT SEASON
FEBRUARY 1, 1973

THE WATER SUPPLY OUTLOOK IS SATISFACTORY TO EXCELLENT FOR MOST MAJOR IRRIGATED AREAS. IF PRESENT DEFICIENT SNOWFALL PATTERNS PERSIST ACROSS NORTHERN AREAS OF THE WEST, WATER SHORTAGES CAN BE EXPECTED IN SMALLER IRRIGATED AREAS OF OREGON, WASHINGTON, NORTHERN IDAHO, NORTHERN AND EASTERN MONTANA AND NORTHEAST WYOMING. RESERVOIR STORAGE IS EXCELLENT.

Reversing the pattern of recent years, the most favorable water supply prospects for the 1973 season are in southwestern areas of the western states. In general, snowfall during the early snow accumulation season has been above to much above average in Arizona, southern California, New Mexico, Utah, Nevada and western Colorado.

Snow accumulation has lagged behind normal in most sections of the Columbia and Missouri basins. The area of greatest deficiency in the Columbia Basin (snow near 40 to 60 percent average) runs in a southwesterly direction from Idaho's Spokane and Clearwater rivers to Oregon's Willamette Valley and includes southwestern Washington. In the Missouri Basin low snow areas (snow near half to two-thirds average) include watersheds along the Continental Divide from Canada south to the Teton River, along the Missouri main stem, the Judith and Musselshell rivers, and the Black Hills of Wyoming and South Dakota.

Unless the present dry trend is reversed on these watersheds, water shortages can be expected in smaller irrigated areas having inadequate reservoir storage facilities. Fortunately, reservoir carryover is excellent throughout the West and will help to offset the effect of low streamflow in most areas.

While the snowpack is low in most of the U.S. portion of the Columbia Basin, it improves somewhat to near 80 to 90 percent on the Upper Columbia and Kootenay rivers in British Columbia. It drops off to near two-thirds to three-fourths normal on the Okanogan, Similkameen and Kettle rivers, according to the British Columbia Water Resources Service, Department of Lands, Forests and Water Resources.

The California Department of Water Resources reports that in general the water supply outlook for 1973 is good. Precipitation has been above normal throughout the State and especially heavy in the Central Valley. Snow surveys show average, or slightly above average, water content in upper watersheds. Reservoir storage is good in most areas but

is below average in the San Joaquin Valley. The last three years in this area have been on the dry side so there will be a close watch on the weather as winter progresses.

In Colorado snowpack on streams east of the Continental Divide is near 10 to 15 percent above normal, except on southern tributaries to the Arkansas where it is about 12 percent below. On the Rio Grande Basin the snow ranges from 15 to 60 percent above normal.

In the Upper Colorado River Basin snow cover averages near 120 percent, but ranges from near 20 percent below normal on Wyoming's Green River to 65 percent above on Colorado's Dolores River. With inflow to Lake Powell for the April-July period forecast at 124 percent, prospects for water and power interests in the Lower Basin are also good.

With streams in Arizona expected to yield near 10 to 35 percent above normal flows, and reservoir storage near two-thirds more than usual, water users here have a bright prospect.

Reservoir storage in the Great Basin is excellent. Combined with normal to as much as twice normal snowpacks, this promises a very good water season this year.

Snow in Alaska ranges from a low of 72 percent average on the Tanana and Chena rivers to a high of 116 percent on the Matanuska and Susitna rivers.

MISSOURI BASIN

Snowfall on the upper Missouri River and its tributaries in Montana has been below average up to this time. It has been particularly light along the Missouri main stem and on streams from the Canadian border southward along the Continental Divide to the Teton River, and on the Judith and Musselshell rivers. Here the snow is near 60 to 65 percent of usual amounts. Farther south the snowpack ranges from near 80 percent on the

SUMMARY OF SNOW WATER EQUIVALENT MEASUREMENTS

FEBRUARY 1, 1973

MAJOR BASIN AND SUB - WATERSHED	WATER EQUIVALENT IN PERCENT OF :		MAJOR BASIN AND SUB - WATERSHED	WATER EQUIVALENT IN PERCENT OF :	
	LAST YEAR	AVERAGE		LAST YEAR	AVERAGE
MISSOURI BASIN			SNAKE BASIN		
Jefferson	51	78	Snake above Jackson, Wyo.	56	84
Madison	59	77	Snake above Hiese, Idaho	55	82
Gallatin	71	87	Snake abv. American Falls Res.	55	83
Missouri Main Stem	37	66	Henry's Fork	56	83
Yellowstone	60	85	Southern Idaho Tributaries	50	120
Shoshone	67	86	Big and Little Wood	65	85
Wind	54	94	Boise	51	88
North Platte	92	117	Owyhee	55	115
South Platte	105	114	Payette	60	88
ARKANSAS BASIN			Malheur	55	95
Arkansas	111	108	Weiser	60	94
Cucharas-Purgatoire	136	88	Burnt	45	80
RIO GRANDE BASIN			Powder	50	90
Rio Grande (Colo.)	111	139	Salmon	58	86
Rio Grande (New Mexico)	140	117	Grande Ronde	45	75
Pecos	162	162	Clearwater	42	62
COLORADO BASIN			LOWER COLUMBIA BASIN		
Green (Wyo.)	53	82	Yakima	32	64
Yampa - White	96	111	Umatilla	15	40
Duchesne	79	127	John Day	40	75
Price	89	137	Deschutes - Crooked	38	70
Upper Colorado	99	114	Hood	20	45
Gunnison	103	126	Willamette	25	50
San Juan	114	141	Lewis	23	49
Dolores	132	165	Cowlitz	26	52
Virgin	119	179	PACIFIC COASTAL BASIN		
Gila	157	117	Puget Sound	34	64
Salt	206	138	Olympic Peninsula	49	73
GREAT BASIN			Umpqua - Rogue	40	70
Bear	60	99	Klamath	40	60
Logan	48	74	Trinity	155	110
Ogden	69	129	CALIFORNIA		
Weber	69	120	CENTRAL VALLEY		
Provo - Utah Lake	94	135	Upper Sacramento	80	110
Jordan	68	116	Feather	110	120
Sevier	140	202	Yuba	100	110
Walker - Carson	111	131	American	95	115
Tahoe - Truckee	101	126	Mokelumne	90	105
Humboldt	78	122	Stanislaus	90	105
Lake Co. (Oregon)	40	70	Tuolumne	90	105
Harney Basin (Oregon)	65	95	Merced	90	105
UPPER COLUMBIA BASIN			San Joaquin	95	105
Columbia (Canada)	70	90	Kings	120	130
Kootenai	57	82	Kaweah	125	140
Clark Fork	42	69	Tule	175	175
Bitterroot	56	78	Kern	155	125
Flathead	44	70	<i>Data for California Watersheds supplied by Dept. of Water Resources, and for British Columbia Watersheds by Dept. of Lands, Forests and Water Resources.</i>		
Spokane	35	52			
Okanogan	42	64	<i>Average is for 1953-67 period. California averages are for the period 1931-70. Based on Selected Snow Courses determined by Dis- tribution within the Basin, Length of Record and Repetitive Monthly Measurement Schedules.</i>		
Methow	47	75			
Chelan	55	81			
Wenatchee	33	61			

Madison and Jefferson to near 90 percent on the Gallatin River.

Moving south into Wyoming the snowpack continues near 80 to 95 percent normal on the Yellowstone, Shoshone and Wind rivers. It falls off to three-fourths average in the Big Horn Mountains, and to only half of the usual amount in the Black Hills.

Snow cover on the North and South Platte rivers is close to 15 percent more than usual.

Moisture in soils underlying the snowpack is generally average or above in Colorado and Wyoming, while in Montana they tend to be drier than normal.

Anticipated flow of streams in Montana ranges from near 60 to 65 percent on the Belt and Marias rivers, and adjacent streams, to essentially average on the upper Yellowstone. Most major streams in southwest Montana have prospects of yielding 80 to 90 percent of average. Similar flows are expected from Wyoming's Shoshone and Wind rivers, while streams heading in the Big Horn Mountains are forecast at 70 to 80 percent.

The North and South Platte and their tributaries are currently forecast to yield from average to 15 percent above average amounts.

Carryover reservoir storage is 119 percent average in Montana, 83 percent average on Wyoming's Wind River, 181 percent on the North Platte and 105 percent in Colorado on the South Platte.

ARKANSAS BASIN

The Arkansas River snowpack is a little above normal for this time of year. If snowfall and spring rains during the remainder of the season are near average, flow of the Arkansas River at Salida should be near 10 percent more than usual. Outlook for the Cucharas River is for normal streamflow, while on the Purgatoire it is for near 10 percent below normal. Flow of the Canadian River in New Mexico should be near, but a little above average.

Storage in John Martin Reservoir is 15 percent of average. In New Mexico on the Canadian River, storage in Conchas Reservoir is 116 percent.

Soil moisture conditions are good in both mountain and valley areas.

Since about 40 percent of the snow season remains, the water outlook could change, but at present it is favorable.

RIO GRANDE BASIN

The snowpack is above average on all watersheds of the Rio Grande Basin. It ranges from near 117 percent in New Mexico to 139 percent in Colorado, while on the Pecos River the snow averages 162 percent with some snow courses showing as much as 170 percent.

Mountain and valley soil moisture conditions are reported to be excellent.

Flow of the Rio Grande near Del Norte, Colorado is expected to be 22 percent more than usual. Inflow to the river system is expected to be 25 percent above normal from the Chama River and 29 percent above from the Conejos River. The water supply of the Pecos River is expected to be comparable, being forecast at 124 percent.

Carryover storage in Elephant Butte, although still not quite up to average, is 148 percent of last year. Storage in El Vado is more than five times its usual amount.

COLORADO BASIN

The present snow cover in the Upper Colorado River Basin is quite favorable, except on the upper Green River in Wyoming. The snow varies from a low of 82 percent on the upper Green to a high of 165 on the Dolores River in southwest Colorado. It is near 10 to 25 percent above normal on the Yampa, White, upper Colorado, Gunnison and Duchesne rivers, near 140 percent on the San Juan and Price rivers.

Soil moisture conditions are generally excellent and will require a minimum of priming from snowmelt water before runoff begins. This, combined with the generally favorable snowpack conditions, provides a fair to excellent water supply outlook next summer for most of the Basin. Prospective runoff is lowest on the upper Green River and its tributaries in Wyoming. Average to 15 percent less than average streamflow is expected from these streams.

Inflow to Flaming Gorge Reservoir is indicated to be near 98 percent average. After contributions from the Yampa, White and Duchesne rivers, flow of the Green River at Green River, Utah is expected to be 108 percent. The Colorado near Cisco, Utah is forecast at 131 percent, while the San Juan near Bluff is up to 142 percent. Present prospects for the April-July inflow to Lake Powell are for 124 percent. Other streams where flows are expected to range from about a third to a half more than usual include the Gunnison, Dolores, Uncompaghere, Animas, Strawberry and Price rivers. Storage in irrigation reservoirs is well above average.

SELECTED STREAMFLOW FORECASTS

FEBRUARY 1, 1973

STREAM AND STATION	FORECASTS THIS YEAR		Forecast Period	Last Year's Flow In (1,000 A.F.)
	Flow In (1,000 A.F.)	Percent of Average		
SASKATCHEWAN				
St. Mary near Babb, Montana <u>1/</u>				
UPPER MISSOURI				
Beaverhead near Grant, Montana <u>2/</u>	80	89	April-July	
Big Hole near Melrose, Montana	520	81	April-July	
Jefferson at Sappington, Montana	760	89	April-July	
Madison near Grayling, Montana <u>3/</u>	300	89	April-July	
Gallatin near Gateway, Montana	350	89	April-July	
Sun at Gibson Dam, Montana <u>4/</u>	500	90	April-July	
Belt near Monarch, Montana	60	60	April-July	
Marias near Shelby, Montana <u>5/</u>	380	65	April-July	
Missouri near Landusky, Montana <u>6/</u>				
near Williston, North Dakota <u>7/</u>				
S. Fk. Musselshell above Martinsdale, Montana				
Milk at Eastern Crossing, Montana				
Yellowstone at Yellowstone Lake Outlet, Wyo.	752	90	April-October	1,111
at Corwin Springs, Montana	1,600	102	April-July	
at Miles City, Montana <u>8/</u>				
Clarks Fork near Belfry, Montana	470	89	April-July	
Shoshone below Buffalo Bill Res., Wyo. <u>9/</u>	714	88	April-Sept.	894
Wind near Duboise, Wyoming	80	81	April-Sept.	150
at Riverton, Wyoming <u>10/</u>	585	90	April-Sept.	879
below Boysen Res., Wyoming <u>11/</u>	695	92	April-Sept.	
Bull Lake Creek near Lenore, Wyoming	169	95	April-Sept.	214
Little Popo Agie near Lander, Wyoming	43	102	April-Sept.	61
Tensleep near Tensleep, Wyoming	59	70	April-Sept.	92
Medicine Lodge near Hyattville, Wyoming	16	80	April-Sept.	22.4
Shell Creek near Shell, Wyoming	53	79	April-Sept.	81
Big Horn near St. Xavier <u>8/</u>				
Tongue near Dayton, Wyoming	80	78	April-Sept.	109
No. Fork Powder near Hazelton, Wyoming	6.6	71	April-Sept.	7.7
PLATTE				
North Platte at Saratoga, Wyoming	566	102	April-Sept.	
Encampment near Encampment, Wyoming	127	100	April-Sept.	131
Laramie & Pioneer Canal, nr Woods, Wyo. <u>12/</u>	123	104	April-Sept.	
Big Thompson at Drake, Colorado <u>13/</u>	110	110	April-Sept.	
Clear at Golden, Colorado <u>14/</u>	125	105	April-Sept.	
St. Vrain at Lyons, Colorado <u>15/</u>	75	107	April-Sept.	
Cache La Poudre near Fort Collins, Colorado <u>16/</u>	245	115	April-Sept.	
ARKANSAS				
Arkansas at Salida, Colorado <u>17/</u>	340	110	April-Sept.	
Cucharas near LaVeta, Colorado	12	100	April-Sept.	
Purgatoire at Trinidad, Colorado	40	90	April-Sept.	
RIO GRANDE				
Rio Grande near Del Norte, Colorado <u>18/</u>	535	122	April-Sept.	
at Otowi Bridge, New Mexico <u>19/</u>	700	136	March-July	
Conejos near Mogote, Colorado <u>20/</u>	235	129	April-Sept.	
El Vado Res., Inflow, New Mexico	235	125	March-July	
Pecos at Pecos, New Mexico	51	124	March-July	
UPPER COLORADO				
Colorado, Grandby Res. Inflow, Colorado <u>21/</u>	225	103	April-Sept.	
near Dotsero, Colorado <u>22/</u>	1,550	113	April-Sept.	
near Cameo, Colorado <u>23/</u>	2,500	113	April-Sept.	
near Cisco, Utah <u>24/</u>	3,660	131	April-July	1,594
Lake Powell Inflow, Arizona <u>25/</u>	8,065	124	April-July	5,578
Roaring Fork at Glenwood Springs, Colorado <u>26/</u>	750	108	April-Sept.	
Uncompahgre at Colona, Colorado	175	135	April-Sept.	

Forecasts in California provided by Department of Water Resources.

Average is for 1953-67 period except California is computed for 1921-70 period.

Forecasts assume average Effective Climate Conditions from Date Through Snow Melt Season.

Explanatory Notes on Forecasts listed on Inside Back Cover

SELECTED STREAMFLOW FORECASTS

FEBRUARY 1, 1973

STREAM AND STATION	FORECASTS THIS YEAR		Forecast Period	Last Year's Flow In (1,000 A.F.)
	Flow In (1,000 A.F.)	Percent of Average		
UPPER COLORADO (continued)				
Gunnison, Blue Mesa Res. Inflow, Colorado <u>27/</u> near Grand Junction, Colorado <u>28/</u>	840 1,500	110 132	April-Sept. April-Sept.	
Dolores at Dolores, Colorado	315	136	April-Sept.	
Green at Warren Bridge, Wyoming	277	86	April-Sept.	431
at Green River, Wyoming <u>29/</u>	790	84	April-Sept.	1,645
Flaming Gorge Res. Inflow, Utah <u>27/</u> at Green River, Utah <u>30/</u>	1,035 2,785	98 108	April-July April-July	1,967 2,030
North Piney at Mason, Wyoming	32	92	April-Sept.	51
Big Sandy near Big Sandy, Wyoming	50	95	April-Sept.	82
Yampa at Steamboat Springs, Colorado	300	115	April-Sept.	
near Maybell, Colorado	950	111	April-Sept.	
Little Snake near Dixon, Wyoming	251	97	April-Sept.	
White near Meeker, Colorado	340	116	April-Sept.	
Strawberry at Duchesne, Utah <u>40/</u>	75	153	April-July	
Duchesne near Tabiona, Utah <u>31/</u> at Randlett, Utah <u>40/</u>	120 325	128 124	April-July April-July	
Lakefork below Moon Lake, Utah <u>32/</u>	70	106	April-July	
Uinta near Neola, Utah	90	113	April-July	
Whiterocks near Whiterocks, Utah	54	106	April-July	46
Price, Scofield Res. Inflow, Utah <u>33/</u>	45	140	April-July	19
Cottonwood near Orangeville, Utah <u>34/</u>	54	123	April-July	33
San Juan, Navajo Res. Inflow, New Mexico <u>27/</u> near Bluff, Utah <u>35/</u>	850 1,260	137 142	April-July April-July	259 276
Animas at Durango, Colorado	600	147	April-Sept.	
LOWER COLORADO				
Virgin near Virgin, Utah	65	171	April-June	
Little Colorado above Lyman, Arizona	12	133	January-June	4.6
Gila near Solomon, Arizona	138	115	January-May	54
Frisco at Clifton, Arizona	67	112	January-May	25.4
Salt at Intake, Arizona	330	117	January-May	112
Tonto above Roosevelt, Arizona	54	127	January-May	6.0
Verde above Horseshoe Dam, Arizona	209	122	January-May	69
GREAT BASIN				
Bear at Utah-Wyo. State Line at Harer, Idaho	126 255	119 113	April-July April-Sept.	
Smith's Fork near Border, Wyoming	97	90	April-Sept.	175
Thomas Fork near Wyo.-Ida. State Line	28	91	April-Sept.	59
Logan near Logan, Utah <u>36/</u>	119	120	April-July	
Ogden, Pine View Res. Inflow, Utah <u>27/</u>	140	156	April-June	136
Weber near Oakley, Utah	105	113	April-June	115
Provo near Hailstone, Utah <u>37/</u>	115	132	April-July	
Strawberry Res. Inflow, Utah	57	139	April-July	38
Utah Lake Net Inflow, Utah	241	123	April-July	204
Big Cottonwood near Salt Lake City, Utah	38	112	April-July	40
Beaver near Beaver, Utah	24	127	April-July	6.4
Sevier near Hatch, Utah near Gunnison, Utah	52 49	157 159	April-July April-July	
So. Fork Humboldt near Elko, Nevada				
Humboldt at Palisades, Nevada	210	136	April-July	139
Truckee at Farad, California <u>38/</u>				
East Carson near Gardnerville, Nevada				
West Carson at Woodsfords, California				
East Walker near Bridgeport, California <u>39/</u>				
West Walker near Coleville, California	148	104	April-July	108
Donner und Blitzen near Frenchglen, Oregon	52	92	March-July	
Silvies near Burns, Oregon	87	86	March-July	
Chewaucan near Paisley, Oregon	67	75	March-July	117
Deep above Adel, Oregon	68	93	March-July	
Bidwell near Ft. Bidwell, California				

Forecasts in California provided by Department of Water Resources.

Average is for 1953-67 period except California is computed for 1921-70 period.

Forecasts assume average Effective Climate Conditions from Date Through Snow Melt Season.

Explanatory Notes on Forecasts listed on Inside Back Cover

FEBRUARY 1, 1973

STREAM AND STATION	FORECASTS THIS YEAR		Forecast Period	Last Year's Flow In (1,000 A.F.)
	Flow In (1,000 A.F.)	Percent of Average		
UPPER COLUMBIA				
Columbia above Steamboat Rapids, B. C.				
at Birchbank, British Columbia <u>40/</u>	40,200	87	April-Sept.	
at Grand Coulee, Washington <u>40/</u>	59,000	85	April-Sept.	
Columbia below Rock Island, Washington	64,000	84	April-Sept.	
Kootenai at Libby, Montana	6,000	86	April-July	
at Leonia, Idaho	6,800	85	April-July	
Blackfoot near Bonner, Montana	680	75	April-July	
So. Fk. Flathead nr Columbia Falls, Montana <u>40/</u>	1,850	83	April-July	
Flathead at Columbia Falls, Montana <u>40/</u>	5,100	85	April-July	
near Polson, Montana <u>40/</u>	5,850	82	April-July	
Clark Fork above Missoula, Montana	1,200	76	April-July	
near Plains, Montana <u>40/</u>	8,100	71	April-July	
at Whitehorse Rapids, Idaho	9,200	72	April-July	
Bitterroot near Darby, Montana	410	79	April-July	
Priest near Priest River, Idaho <u>41/</u>				
Pend Oreille below Box Canyon, Washington				
Kettle near Laurier, Washington				
Spokane at Post Falls, Idaho <u>42/</u>	2,130	70	April-Sept.	
Similkameen near Nighthawk, Washington				
Okanogan near Tonasket, Washington	1,220	70	April-Sept.	
Methow near Pateros, Washington				
Stehekin at Stehekin, Washington				
Chelan at Chelan, Washington <u>43/</u>	1,080	85	April-Sept.	
Wenatchee at Peshastin, Washington	1,450	80	April-Sept.	
SNAKE				
Snake above Palisades Res., Wyoming <u>44/</u>	2,300	90	April-Sept.	3,504
near Heise, Idaho <u>45/</u>	3,350	90	April-Sept.	
near Blackfoot, Idaho <u>46/</u>				
at Weiser, Idaho				
Grey's above Palisade, Wyoming	320	88	April-Sept.	556
Salt above Palisade, Wyoming	300	93	April-Sept.	575
Henry's Fork near Ashton, Idaho <u>47/</u>				
Teton near St. Anthony, Idaho				
Blackfoot Reservoir Inflow, Idaho				
Big Lost near MacKay, Idaho <u>48/</u>	165	98	April-Sept.	
Portneuf at Topaz, Idaho				
Salmon Falls Creek nr San Jacinto, Idaho				
Big Wood, Inflow to Magic Res., Idaho <u>49/</u>	235	90	April-Sept.	
Bruneau near Hot Springs, Idaho				
Boise near Boise, Idaho <u>50/</u>	1,510	97	April-Sept.	
Jordan near Jordan Valley, Oregon	72	85	April-Sept.	
Owyhee near Owyhee, Nevada <u>51/</u>	80	133	April-July	86
Owyhee Res. Net Inflow, Oregon <u>27/</u>	459	105	February-July	1,078
Malheur near Drewsey, Oregon	103	93	February-July	
Payette near Horseshoe Bend, Idaho <u>52/</u>	1,800	98	April-Sept.	
Weiser above Crane Creek, Idaho <u>40/</u>				
Burnt near Hereford, Oregon <u>40/</u>	39	82	February-July	
Powder near Sumpter, Oregon	40	72	April-Sept.	
Eagle above Skull Creek, Oregon				
Imnaha at Imnaha, Oregon	251	82	April-Sept.	
Salmon at Whitebird, Idaho	5,900	86	April-Sept.	
Lostine near Lostine, Oregon	106	85	April-Sept.	
Grande Ronde at LaGrande, Oregon	112	64	April-Sept.	205
Clearwater at Spalding, Idaho	6,350	74	April-Sept.	
LOWER COLUMBIA				
Yakima at CleElum, Washington <u>53/</u>				
near Parker, Washington <u>54/</u>	1,220	70	April-Sept.	
Naches near Naches, Washington <u>55/</u>				

Forecasts in California provided by Department of Water Resources.
Average is for 1953-67 period except California is computed for 1921-70 period.
Forecasts assume average Effective Climate Conditions from Date Through Snow Melt Season.
• Explanatory Notes on Forecasts listed on Inside Back Cover.

SELECTED STREAMFLOW FORECASTS

FEBRUARY 1, 1973

STREAM AND STATION	FORECASTS THIS YEAR		Forecast Period	Last Year's Flow In (1,000 A.F.)
	Flow In (1,000 A.F.)	Percent of Average		
LOWER COLUMBIA (continued)				
Walla Walla, So. Fk. near Milton, Oregon	70	89	March-Sept.	
Umatilla at Pendleton, Oregon	135	65	March-Sept.	
John Day, Middle Fork at Ritter, Oregon	96	71	March-July	
North Fork at Monument, Oregon	443	78	March-July	
Crooked near Post, Oregon	75	74	April-Sept.	
Deschutes at Benham Falls, Oregon <u>40/</u>	536	90	April-Sept.	
Columbia at The Dalles, Oregon <u>40/</u>	86,000	82	April-Sept.	
Hood near Tucker Bridge, Oregon <u>40/</u>	232	69	April-Sept.	
McKenzie near Vida, Oregon	1,004	76	April-Sept.	
Santiam, South, at Waterloo, Oregon	405	64	April-Sept.	
North, at Mehama, Oregon <u>40/</u>	576	64	April-Sept.	
Clackamas at Estacada, Oregon	570	71	April-Sept.	
Willamette at Salem, Oregon <u>40/</u>	3,496	67	April-Sept.	
Lewis at Ariel, Washington <u>56/</u>				
Cowlitz at Castle Rock, Washington <u>57/</u>				
NORTH PACIFIC COASTAL				
Dungeness near Sequim, Washington				
Umpqua, No., near Toketee Falls, Oregon <u>40/</u>	150	85	April-Sept.	
Rogue at Raygold, Oregon	800	85	April-Sept.	1,132
Klamath Lake, Net Inflow, Oregon	755	76	Feb.-Sept.	1,202
Trinity at Lewiston, California	650	105	April-July	479
CALIFORNIA CENTRAL VALLEY <u>40/</u>				
Sacramento, Inflow to Shasta, California	1,880	106	April-July	1,621
Feather near Oroville, California	1,940	104	April-July	1,198
Yuba at Smartville, California	1,080	100	April-July	760
American, Inflow to Folsom Res., Calif.	1,370	104	April-July	916
Cosumnes at Michigan Bar, California	195	135	April-July	65
Mokelumne, Inflow to Pardee Res., Calif.	480	103	April-July	316
Stanislaus, Inflow to Melones Res., Calif.	710	99	April-July	456
Tuolumne, Inflow to Don Pedro Res., Calif.	1,140	96	April-July	722
Merced, Inflow to Exchequer Res., Calif.	565	93	April-July	371
San Joaquin, Inflow to Millerton Lake, Calif.	1,220	102	April-July	701
Kings, Inflow to Pine Flat Res., California	1,320	113	April-July	537
Kaweah, Inflow to Terminus Res., California	340	125	April-July	93
Tule, Inflow to Success Res., California	80	136	April-July	7
Kern, Inflow to Isabella Res., California	500	119	April-July	118
ALASKA				
Chena at Fairbanks, Alaska				
Salcha near Salchaket, Alaska				

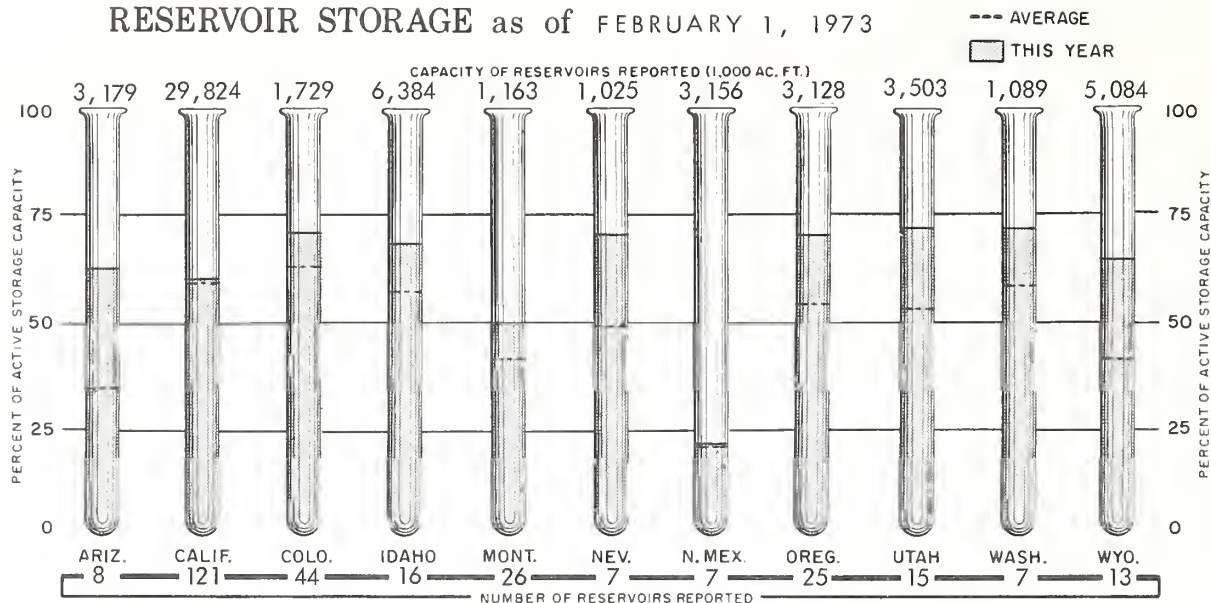
Forecasts in California provided by Department of Water Resources.

Average is for 1953-67 period except California is computed for 1921-70 period.

Forecasts assume average Effective Climate Conditions from Date Through Snow Melt Season.

Explanatory Notes on Forecasts listed on Inside Back Cover.

RESERVOIR STORAGE as of FEBRUARY 1, 1973



In the lower Colorado Basin the Virgin River is forecast at 171 percent. The current water supply outlook is very good for all of Arizona. Reservoir storage is very good in all major reservoirs. Salt River Project reservoirs are 44 percent above average, while San Carlos contains 4 times its usual amount.

Snow cover varies from 117 percent on the Gila River and 138 percent on the Salt, to twice average on the Verde watersheds.

Salt River Project streams are predicted to produce 477,000 acre-feet during the February-May period. Forecasts for streams tributary to the Project range from 10 to 30 percent above average. The Gila River will supply adequate water for the San Carlos Project. It is forecast at 112 percent.

GREAT BASIN

Most areas of the Great Basin have snowpacks which are near or well above average. This, combined with excellent reservoir storage, foreshadows generally good to excellent water supplies next summer.

While this year's snowpack is far less than last year in many areas--principal exceptions being the Sevier River and streams near Reno, Nevada--in most areas of Utah and Nevada it ranges from 120 to 135 percent. On the Sevier River it is twice normal, while on the Bear River it is average. It drops to near three-fourths normal in Lake County, Oregon and on Utah's Logan River. Snow in Oregon's Harney Basin is 95 percent average.

Forecast flows for Oregon streams range from 75 percent on the Chewaucan near Paisley to 93 percent on Deep Creek above Adel. In Nevada, water users on the Humboldt River now can anticipate the flow at Palisades to be near 136 percent of average. On the lower Humboldt, storage in Rye Patch Reservoir is 217 percent of the usual amount and virtually assures excellent water supplies next summer for users served by this system.

Flow of the Sierra-Nevada streams into Nevada is expected to be average or higher. Reservoir storage is now 134 percent in the Truckee watershed, 131 percent in the Carson and 84 percent in the Walker River. Snow cover in eastern and southeastern Nevada is favorable--and up to 189 percent in the Meadow Valley Wash area.

In Utah stream forecasts range from a low of 90 percent on Wyoming's Smith Fork to a high of 159 percent on the Sevier River near Gunnison. Inflow to Pineview Reservoir on the Ogden River is forecast at 156 percent. Most streams near Salt Lake and Provo have prospects of yielding near 115 to 140 percent of normal, with some lower elevation watersheds as high as 150 percent.

Reservoir storage in Utah is excellent, generally ranging near 135 percent of average.

COLUMBIA BASIN

A poor to adequate water supply is anticipated next summer for most of the Columbia

STORAGE IN LARGE RESERVOIRS

FEBRUARY 1, 1973

BASIN AND NAME OF RESERVOIR	CAPACITY (1,000 A.F.)	STORAGE (1,000 A.F.)	STORAGE PERCENT AVERAGE	BASIN AND NAME OF RESERVOIR	CAPACITY (1,000 A.F.)	STORAGE (1,000 A.F.)	STORAGE PERCENT AVERAGE
UPPER MISSOURI				UPPER COLUMBIA			
Belle Fourche	185	154	213	Chelan	676	237	74
Boysen	550	281	69	Coeur d'Alene	225	153	124
Buffalo Bill	373	231	152	Duncan	1,347	607	---
Canyon Ferry	2,043	1,458	91	Flathead	1,791	1,223	103
Fort Peck	19,410	16,284	149	Hungry Horse	3,428	2,362	96
Garrison	24,790	20,362	186	Kootenay	673	617	98
Hebgen	377	254	150	Lake Koocanusa		275	---
Keyhole	192	158	479	Lower Arrow	3,083	763	188
Lake Francis Case	5,816	3,319	108	Noxon Rapids	335	309	97
Lake Sharp	1,900	1,762	106	Pend Oreille	1,155	415	81
Oahe	23,630	17,683	163	Roosevelt	5,232	4,937	130
Tiber	1,347	496	79	Upper Arrow	4,061	775	89
Big Horn	1,356	917	127	LOWER COLUMBIA			
PLATTE				Cougar	155	4	---
City of Denver (5)	507	191	114	Detroit	300	24	57
Colo-Big Thompson (3)	718	521	131	Green Peter	270	28	---
Glendo	784	332	123	Hills Creek	200	18	82
Pathfinder	1,016	884	258	Lookout Point	337	14	30
Seminole	1,010	571	160	Prineville	153	109	108
ARKANSAS				Wickiup	200	185	115
Conchas	273	141	116	Yakima Res. (5)	1,066	758	121
John Martin	354	12	15	SNAKE			
RIO GRANDE				American Falls	1,700	1,081	87
Elephant Butte	2,195	334	89	Anderson Ranch	423	296	131
El Vado	195	22	550	Arrowrock	287	276	121
UPPER COLORADO				Brownlee	980	632	113
Blue Mesa	830	334	---	Cascade	653	372	134
Flaming Gorge	3,749	2,962	228	Dworshak		2,279	---
Navajo	1,696	946	333	Jackson	847	628	143
Powell	25,002	12,253	237	Lucky Peak	278	124	114
Starvation	152	130	---	Owyhee	715	566	158
LOWER COLORADO				Palisades	1,200	969	144
Havasu	619	552	102	Warm Springs	191	103	137
Mead	26,159	19,209	116	PACIFIC COASTAL			
Mohave	1,810	1,615	96	Clair Engle	2,448	2,045	105
Salt River Res. (4)	1,755	1,207	130	Clear Lake	440	298	144
San Carlos	949	410	415	Nacimiento	350	138	81
Verde River Res. (2)	318	274	274	Ross	1,203	822	86
GREAT BASIN				Upper Klamath	584	410	114
Bear	1,421	1,115	131	CALIFORNIA CENTRAL VALLEY			
Lahontan	314	227	131	Almanor	1,036	670	101
Rye Patch	179	146	218	Berryessa	1,602	1,423	93
Sevier Bridge	236	112	169	Bullards Bar	930	497	90
Strawberry	274	178	152	Folsom	1,010	595	105
Tahoe	732	516	130	Isabella	570	67	40
Utah	884	742	143	McClure	1,026	345	64
Willard Bay	193	156	---	Millerton	521	413	111
				Oroville	3,484	2,813	127
				Pine Flat	1,013	393	69
				Shasta	4,500	3,286	100

Reservoir Storage Data Provided by Bureau of Reclamation, Corps of Engineers, Geological Survey, and water using organizations. Data from California and British Columbia provided by Department of Water Resources and Department of Lands, Forests and Water Resources, respectively.

Basin. Near 15 to 35 percent below normal runoff is expected from most streams in the Basin. Principal exception is from tributaries to the Snake River in southern Idaho and southeastern Oregon, as well as inflow to Kootenai and Arrow Lakes in British Columbia where streams should yield within 5 to 10 percent of average.

Lowest runoff (near 25 to 35 percent below normal) is expected from Oregon's Willamette, Hood, Crooked, John Day, Umatilla, Grande Ronde and Powder rivers; Washington's Lewis, Cowlitz, Yakima, Okanogan and smaller northeast Washington streams; Idaho's Spokane, Palouse and Clearwater rivers, and Montana's Clark Fork.

Highest runoff prospects (near a third above normal) exist in Nevada and southern Idaho on the upper Owyhee, Bruneau and Salmon Falls rivers.

Snow accumulation to February 1 has lagged behind normal over much of the Basin. On the major water producing areas of the Columbia and Kootenay rivers in British Columbia the snowpack is near 80 to 90 percent average. The snow falls off to 60 to 80 percent in western Montana and along the Cascade mountains from the Yakima to Okanogan rivers.

The area of greatest deficiency (snow generally 40 to 60 percent) runs in a southwest-erly direction from the Spokane-Clearwater rivers in Idaho to the Willamette Valley in Oregon. Snow on the Snake River tributaries from the Salmon River and southward is within 20 percent of average except near the Idaho-Nevada border where it ranges from 25 to 40 percent greater than normal.

If the present trend to a deficient snow-pack continues, many smaller irrigated areas having inadequate storage facilities can expect water shortages next summer--particularly in Oregon and Washington.

Flow of the Columbia River at The Dalles is anticipated at near 20 percent less than normal.

Reservoir storage is good, due primarily to excellent carryover from last year's high runoff.

ALASKA

Snow surveys made at a limited number of Alaskan snow courses indicate that snow accumulation so far this winter has lagged behind the normal amount on a number of watersheds. The Tanana and Chena watersheds are lowest, reporting 72 percent of average and 61 percent of last year's snowpack.

Snow on the Copper River now stands at just half of last year's amount. It is 85 percent of what is normally expected on February 1.

Upper Cook Inlet and Kenai Peninsula watersheds have accumulated near average snowpacks, while the Matanuska and Susitna rivers are holding above average snows--at 116 percent of normal.

CALIFORNIA

The California Department of Water Resources, coordinating agency for snow surveys and water supply forecasting in California, reports that the February assessment of water supply potentials for the State indicate generally favorable runoff and reservoir conditions for 1973. At this time the outlook for adequate water supplies in the Sacramento Valley appears excellent, and suggests that relief for the San Joaquin Valley from the dry conditions of the past three years may be forthcoming.

Precipitation over the State for the water year to date has been 130 percent of average, ranging from 105 percent in the South Coastal area to 180 percent in the San Francisco Bay area. Precipitation in the Central Valley drainage area has been about one-and-one-half times normal for the period. The heaviest amounts fell during January when many stations exceeded 200 percent of average for the month.

February 1 snow surveys reveal that snow water content is 115 percent of normal on a statewide basis. This varies from 105 percent in the Lahontan drainage area to 115 percent on Central Valley headwater areas. A warm storm period in early January depleted snow accumulations at lower elevations and reduced the higher elevation pack. Subsequent storms and colder weather reinforced the snowpack as the month progressed, resulting in the present slightly above average conditions.

Runoff during the first four months of the water year has been 145 percent of average. All areas of the State are above average except for streams in the South Coastal area where only 65 percent of average flow occurred during the period. Runoff was 105 percent in the San Joaquin Valley, 145 percent in the Sacramento Valley, and ranged up to 195 percent in northern coastal regions. Much of this was produced in January when runoff exceeded 200 percent of average in some coastal areas during the month.

Reservoir storage in 121 of California's major reservoirs was average for February 1, although this varied widely in individual reservoirs. In the Sacramento Valley, reservoir storage is slightly above average and some flood control releases were necessary

during January when several intense precipitation periods resulted in above normal inflows and encroached on reserved space for flood control. Reservoir storage on San Joaquin Valley streams is less favorable. Storages range from 30 percent of average in Terminus Reservoir on the Kaweah River to 140 percent for Courtright Reservoir on the Kings River. Although carryover storages are short on San Joaquin Valley tributaries, present measurements of snow water content hold a promise for improved conditions this season.

Forecasts of water year supplies for California call for 110 percent of average amounts, based on present watershed conditions. Most streams in the Central Valley are forecasted to produce from average to 120 percent of average flows. The only streams in the State where below average water year runoff is anticipated are the East Walker River, on the east side of the Sierra, and the Merced River which drains from Yosemite National Park in the Central Sierra. With normal snow accumulation in the remaining winter months, forecasted water supplies should remain average or above in almost all areas of the State.



EXPLANATION of STREAMFLOW FORECASTS

All flows are observed flows except as adjusted for: 1/ Storage change in Lake Sherburne. 2/ Storage change in Lima and Clark Canyon reservoirs. 3/ Storage change in Hebgen Lake. 4/ Storage change in Gibson Reservoir and measured diversions. 5/ Storage change in Two Medicine, Four Horns, Lake Francis and Swift reservoirs. 6/ Storage change in Canyon Ferry and Tiber reservoirs. 7/ Changes as indicated in (6/), (8/), plus storage change in Fort Peck. 8/ Storage change in Boysen, Buffalo Bill and Yellowtail reservoirs. 9/ Storage change in Buffalo Bill Reservoir plus Heart Mountain diversion. 10/ Storage change in Pilot Butte and Bull Lake reservoirs plus Wyoming canal diversion.

11/ Changes indicated in (10/) plus storage change in Boysen Reservoir. 12/ Plus diversions to Cache LaPoudre. 13/ Plus by-pass to power plants. 14/ Minus diversion thru Gumlick Tunnel. 15/ Storage change in Price Reservoir. 16/ Minus diversions from North Platte, Laramie and Colorado rivers plus measured diversions above station. 17/ Storage change in Clear Creek, Twin Lakes and Turquoise reservoirs minus diversions from Colorado River. 18/ Storage change in Rio Grande, Santa Maria and Continental reservoirs. 19/ Storage change in El Vado and Abiquiu reservoirs. 20/ Storage change in Platoro Reservoir.

21/ Storage change in Grandby Reservoir as furnished by U.S.B.R. plus diversions by Adams Tunnel and Grand River Ditch. 22/ Changes as indicated in (21/) plus diversions thru Roberts, Gumlick and Moffat tunnels and storage change in Dillon, Homestake, Williams Fork, Green Mountain and Willow Creek reservoirs. 23/ Changes indicated in (22/) and (26/). 24/ Storage change in Blue Mesa Reservoir. 25/ Changes indicated in (24/), (30/) and (35/) and storage change in Lake Powell. 26/ Diversions to Arkansas River plus storage change in Ruedi Reservoir. 27/ (Inflow record as computed by U. S. Bureau of Reclamation.) 28/ Storage change in Taylor, Blue Mesa and Morrow Point reservoirs. 29/ Storage change in Fontenelle Reservoir. 30/ Storage change in Flaming Gorge Reservoir.

31/ Plus diversion through Duchesne Tunnel. 32/ Storage change in Moon Lake Reservoir. 33/ Storage change in Scofield Reservoir. 34/ Storage change in Joe's Valley Reservoir. 35/ Storage change in Navajo Reservoir. 36/ Plus U. P. & L. Co. tailrace and Logan, Hyde Park and Smithfield canals. 37/ Minus diversions thru Duchesne Tunnel and Weber-Provo Canal. 38/ Storage change in Lake Tahoe and Boca reservoirs (Forecast by Truckee Basin Committee.) 39/ Storage change in Bridgeport Reservoir. 40/ Corrected for major upstream impairments -- represents simulated natural flow conditions.

41/ Storage change in Priest Lake. 42/ Storage change in Coeur d'Alene Lake and diversions by Spokane Valley Farms Co. and Rathrum Prairie canals. 43/ Storage change in Lake Chelan. 44/ Storage change in Jackson Lake. 45/ Storage change in Jackson Lake and Palisade reservoirs. 46/ Storage change in Jackson Lake, Palisades, Island Park, Henry's Lake, Grassy Lake plus diversions between Heise and Blackfoot. 47/ Storage change in Henry's Lake and Island Park reservoirs. 48/ Storage change in MacKay Reservoir and diversion in Sharp Ditch. 49/ Combined flow Big Wood near Bellevue and Camas Creek near Blaine. 50/ Storage change in Arrowrock, Anderson Ranch and Lucky Peak reservoirs.

51/ Storage change in Wild Horse Reservoir. 52/ Storage change in Cascade and Deadwood reservoirs. 53/ Storage change in Keechelus, Kachess and CleElum reservoirs plus diversion by Kittitas Canal. 54/ Changes indicated in (52/) plus storage change in Bumping and Rimrock Lakes plus diversion by Roza, Union Gap, New Reservation, Old Reservation and Sunrise canals. 55/ Storage change in Bumping and Rimrock lakes and diversions by Tieton, Selah Valley, Wapatox canals and City of Yakima. 56/ Storage change in Merwin, Yale and Swift reservoirs. 57/ Storage change in Mayfield Reservoir.

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